TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No. 3738

In Re Application Of: **REMBOLD, H., ET AL**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/587,795	07/31/2006	WILLOUGHBY, T.R.	278	2836	4039

Invention: **METHOD FOR OPERATING A SOLENOID...**

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08/07/2009

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Dated: **10/07/2009**

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Examiner: WILLOUGHBY, T.R. Art Unit: 2836 Docket No.: 3738

In re:

Applicant: REMBOLD, Helmut, et al.

Serial No.: 10/587,795

Filed: July 31, 2006

APPEAL BRIEF

October 7, 2009

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sirs:

Appellants submit the following for their brief on appeal and respectfully request withdrawal of the outstanding rejections and placement of the application in line for allowance in consideration of same.

I. REAL PARTY IN INTEREST

The real party in interest in the instant application is the assignee of the application, Robert Bosch GmbH, Stuttgart, Germany.

II. RELATED APPEALS AND INTERFERENCES

Appellant is unaware of any related appeals or interferences with regard to the application.

III. STATUS OF CLAIMS

Claims 1-9 are pending; claims 1-9 are appealed.

IV. STATUS OF AMENDMENTS

A Final Office Action finally rejecting claims 1-9 was mailed on April 22, 2009. An Amendment/Request for Reconsideration was submitted on June 22, 2009, in which further arguments as to the patentability of claims 1-9 were presented.

An Advisory Action was mailed July 10, 2009, indicating that the June 22, 2009, Amendment/Request was considered, but was found determined by the Examiner not to place the application in condition for allowance for the reasons cited in the attached continuation sheet. Appellants filed their Notice of Appeal on August 7, 2009.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 defines a method for controlling a solenoid valve (22) **[page 1, lines 4-6; Fig. 2]**, particularly in a motor vehicle, in a case of which a first voltage (U_1) is applied to a coil (21) of the solenoid valve (22) until a first point in time t_1 **[page 7, lines 23-24; Figs. 3, 5]**, then a second voltage (U_2) with a smaller effective value is applied **[page 8, line 29-page 9, line 2; Figs. 3, 5]**,

wherein the first point in time t_1 precedes a point in time at which the solenoid valve (22) reaches a final position **[page 10, lines 1-3; Figs. 3, 5]**, and

wherein the smaller effective value of the second voltage (U_2) is realized by pulse-width modulating the first voltage (U_1) **[page 2, line 28-page 3, line 3; page 11, lines 16-23]**.

Independent claim 7 defines a device for controlling a solenoid valve (22) **[page 1, lines 4-6; Fig. 2]**, particularly in a motor vehicle, in a case of which a first voltage (U_1) is applied to a coil (21) of the solenoid valve (22) until a first point in time t_1 **[page 7, lines 23-24; Figs. 3, 5]**, then a second voltage (U_2) with a smaller effective voltage value is applied **[page 8, line 29-page 9, line 2; Figs. 3, 5]**,

wherein the first point in time t_1 precedes a point in time at which the solenoid valve (22) reaches a final position **[page 10, lines 1-3; Figs. 3, 5]**, and

wherein the smaller effective value of the second voltage (U_2) is realized by pulse-width modulating the first voltage (U_1) **[page 2, line 28-page 3, line 3; page 11, lines 16-23]**.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether independent claims 1 and 7, and claims 2-4 and 8, which depend respectively from independent claims 1 and 7, are patentable under 35 USC §102(b) over US Patent No. 5,678,521 to Thompson, et al. ("Thompson").

2. Whether claims 5, which depends from independent claim 1, is patentable under 35 USC §103(a) over Thompson in view of US Patent No. 5,381,297 to Weber ("Weber").

3. Whether claim 9, which depends from independent claim 1, is patentable under §103(a) over Thompson in view of US Patent No. 6,807,947 to Coates, et al. ("Coates").

VII. ARGUMENT

1. Independent claims 1 and 7, and claims 2-4 and 8, which depend respectively from independent claims 1 and 7, are patentable under 35 USC §102(b) over Thompson.

In the final rejection, the Examiner asserts that Thompson teaches controlling a solenoid valve [20] by applying a first voltage (Boost V_{DC}) to a coil [20] until a first point in time (T1), then a second voltage (Notch V_{DC} or intermediate boost voltage) with a smaller effective value is applied, wherein the

first point in time T1 precedes a point at which the solenoid valve [20] reaches its final position. The Examiner further asserts that injection solenoid controller [202] provides a pulse width modulating activating signal to the solenoid [20], and that controller [202] generates the second or intermediate boost voltage (Notch V_{DC}) by pulse width modulating Boost V_{DC}.

In their Amendment/Request for Reconsideration submitted on June 22, 2009, Appellants disagreed that Thompson discloses generating a smaller effective voltage by pulse width modulating the first voltage applied to the coil, as claimed.

That is, Appellants argued that while Thompson's injection solenoid controller [202] may generate a "pulse width modulating activating signal" to maintain current in a predetermined range **[described at col. 17, lines 14-51]**, Thompson's pulse width activating signal was not equivalent to a second voltage having a smaller effective value than a first voltage and generated by pulse-width modulating the first voltage, as claimed. That is, Appellants argued that Thompson does not teach or suggest that the smaller effective value of Thompson's second or intermediate boost voltage (Notch V_{DC}) is realized by pulse-width modulating Thompson's first voltage (Boost V_{DC}).

In the Advisory Action, Examiner disagrees with the argument presented in the Amendment/Request For Reconsideration. The Continuation Sheet (PTO-303) insists that Thompson's second or intermediate boost voltage (Notch V_{DC} at T_1) is a pulse width modulated variation a first voltage (Boost V_{DC} at T_0) and that Thompson's injection solenoid controller (202) applies "electrical control signals"

(Boost V_{DC}, high current solenoid pull-in signal, low current solenoid holding signal (Notch V_{DC})) to provide a "pulse width modulating activating signal."

Appellants respectfully disagree with such reasoning and request the Board of Appeals to overrule the final rejections, and pass the application to allowance.

Appellants' device and method for controlling a solenoid valve as claimed has the advantage that a first voltage is initially applied to a coil of the solenoid valve until a first point in time is reached, and then a second voltage having a smaller value than that of the first voltage is applied. The switchover to the second voltage at the first point in time takes place before the solenoid valve reaches its final position. The particular advantage of this inventive method is that, with the first applied voltage, the coil current and, therefore, the magnetic force builds up rapidly, thereby enabling the solenoid valve to start moving sooner. By switching over to a second, lower voltage value, an unnecessary increase in coil current is prevented.

The first point in time can lie before or after a certain force value at which the solenoid armature begins to move is reached. It is important that a reliable start-up of the solenoid armature is ensured by way of the inventive control. The inventive method can be used on valves that are open or closed with no current. By switching over to a second voltage with a value that is lower than that of the first voltage, the situation is avoided in which the coil current exceeds a maximum permissible current when control of the solenoid valve continues.

The effective voltage of at least one of the voltages applied to the coil of the solenoid valve is influenced via pulse-width modulation. The advantage of this is that all voltages starting from a basic voltage can be adjusted solely via pulse-width modulation in accordance with the desired voltage level.

The Thompson method for controlling a solenoid valve is similar in some respects, but does not operate to generate a second voltage (U_2) from a first voltage (U_1) by pulse-width modulating the first voltage (U_1), as claimed. Thompson's first voltage (Boost V_{DC}) is provided by a boost circuit supplied by a battery **[see Thompson's col. 34, lines 34-38; Figs. 14 and 20]**. When a first point in time (T1) is reached, Thompson supplies the second or intermediate boost voltage (Notch V_{DC}), which is the actual battery voltage **[see Thompson's col. 34, lines 38-41; Figs. 14 and 20]**.

While Thompson's controller 202 monitors current through the injector solenoid, and provides a pulse width modulating activating signal to maintain current therein within a predetermined range, for example, 18-22 amperes during pull-in voltage operation [col. 17, lines 45-51], such structure and operation does not disclose an equivalent limitation of: wherein the smaller effective value of the second voltage is realized at the first point in time by pulse-width modulating the first voltage, as claimed (emphasis added).

Put another way, while Thompson's controller 202 may generate a "pulse width modulated activating signal" in response to detected current levels, the controller does not pulse width modulate a first voltage signal to generate a second voltage signal with a smaller effective voltage value, as claimed.

Thompson, therefore, is not a proper reference under 35 USC §102 pursuant to the guidelines set forth in the last paragraph of MPEP §2131, where it is stated that "a claim is anticipated only if each and every element as set forth in the claims is not found, either expressly or inherently described, in a single prior art reference," and that "the identical invention must be shown in as complete detail as is contained in the ... claim."

Independent claims 1 and 7 are therefore patentable under 35 USC §102(b) over Thompson. Claims 2, 3, 4 and 6 that depend from claim 1, and claim 8 that depends from claim 7also are patentable under section 102(b) over Thompson for at least the same reasons.

2. Claim 5 is patentable under 35 USC §103(a) over Thompson in view of Weber.

Weber, like Thompson, fails to teach or suggest a method or device for controlling a solenoid that includes generating a second voltage having a lesser effective value than a first voltage by pulse-width modulating the first voltage (Boost V_{DC}). Therefore, and because claim 1 is patentable over Thompson under 35 USC §102(b) for the reasons set forth above, dependent claim 5 is patentable over Thompson in view of Weber under 35 USC §103(a).

3. Claim 9 is patentable under §103(a) over Thompson in view of Coates.

Coates, like Thompson, fails to teach or suggest a method or device for controlling a solenoid that includes generating a second voltage having a lesser effective value than a first voltage by pulse-width modulating the first voltage (Boost V_{DC}). Therefore, and because claim 7 is patentable over Thompson under 35 USC §102(b) for the reasons set forth above, dependent claim 9 is patentable over Thompson in view of Coates under 35 USC §103(a).

In view of the foregoing discussion, it is respectfully requested that the Honorable Board of Patent Appeals and Interferences overrule the final rejection of claims 1-4 and 6-8 under 35 USC §102(b) over Thompson, claims 5 under 35 USC §103(a) over Thompson in view of Weber and claim 9 under §103(a) over Thompson in view of Coates.

Respectfully Submitted,

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VIII. CLAIMS APPENDIX

Copy of Claims Involved in the Appeal:

1. A method for controlling a solenoid valve (22), particularly in a motor vehicle, in a case of which a first voltage (U_1) is applied to a coil (21) of the solenoid valve (22) until a first point in time t_1, then a second voltage (U_2) with a smaller effective value is applied,

wherein the first point in time t_1 precedes a point in time at which the solenoid valve (22) reaches a final position, and

wherein the smaller effective value of the second voltage (U_2) is realized by pulse-width modulating the first voltage (U_1).

2. The method as recited in Claim 1,

wherein the second voltage (U_2) is at least so great that the final position of the solenoid valve (22) is reached.

3. The method as recited in Claim 1,

wherein a current (I) continues to climb while the second voltage (U_2) is being applied.

4. The method as recited in Claim 1,

wherein starting at a point in time (t_2), a third voltage (U_3) is applied to the coil of the solenoid valve, an effective value of which is essentially equal to or less than the effective value of the second voltage (U_2) and which does not allow the current to increase further as compared with the second voltage (U_2).

5. The method as recited in Claim 1,

wherein starting at a third point in time (t_3), a fourth voltage (U_4) is applied to the coil of the solenoid valve, an effective value of which is essentially less than the effective value of the third voltage (U_3) such that a lesser current flows after time t_3, the lesser current being at least so great that a minimum holding force of a fuel supply control valve is ensured.

6. The method as recited in Claim 5,

wherein an effective voltage of at least one of the voltages (U_3, U_4) applied to the coil of the solenoid valve is influenced via pulse-width modulation.

7. A device for controlling a solenoid valve (22), particularly in a motor vehicle, in a case of which a first voltage (U_1) is applied to a coil (21) of the solenoid valve (22) until a first point in time t_1, then a second voltage (U_2) with a smaller effective voltage value is applied,

wherein the first point in time t_1 precedes a point in time at which the solenoid valve (22) reaches a final position, and

wherein the smaller effective value of the second voltage (U_2) is realized by pulse-width modulating the first voltage (U_1).

8. The device as recited in Claim 7,

wherein the points in time t_1, 2, 3, 4 and the electrical voltages U_1, 2, 3, 4 are stored in a program map as a function of operating variables.

9. A computer program product with program code that is stored on a machine-readable storage device for carrying out the method as recited in Claim 1 when the program is run on a computer.

IX. EVIDENCE APPENDIX.

None.

X. RELATED PROCEEDINGS APPENDIX.

None.